

10/064754

JC13 Rec'd PCT/PTO 28 FEB 2002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Wilhelm Polach et al

Based on PCT/DE 01/02179

For: Common Rail System

**PRELIMINARY AMENDMENT**

Commissioner for Patents  
Washington, D.C. 20231

Sir:

Prior to examination, please amend the above-identified application as follows:

**IN THE SPECIFICATION**

**Page 1**, Between the title and paragraph [0001], insert the following:

[0000.2] CROSS-REFERENCE TO RELATED APPLICATIONS

[0000.4] This application is a 35 U.S.C. 371 application of PCT/DE 01/02179 filed on June 12, 2001.

[0000.6] BACKGROUND OF THE INVENTION

Replace the paragraph [0001] with the following rewritten paragraph:

[0001] Field Of The Invention

Between paragraphs [0002] and [0003] insert the following:

[0002.5] Description of the Prior Art

**Page 2**, Between paragraphs [0004] and [0005] insert the following new paragraph:

[0004.5] SUMMARY OF THE INVENTION

Delete paragraph [0007]:

[0007] **Advantages of the Invention**

**Page 4**, Between paragraphs [0012] and [0013] insert the following:

[0012.5] BRIEF DESCRIPTION OF THE DRAWINGS

Replace paragraph [0013] with the following rewritten paragraph:

[0013] Further advantages, characteristics and details of the invention will become apparent from the ensuing description, taken with the drawings, in which:

Delete paragraph [0014]:

Delete paragraph [0015]:

Replace paragraph [0016] with the following rewritten paragraph:

[0016] Fig. 1 is an elevation view of a longitudinal section through a common rail system of the invention; and

Replace paragraph [0018] with the following rewritten paragraph:

[0018] DESCRIPTION OF THE PREFERRED EMBODIMENTS

**Page 6**, After paragraph [0027] insert the following new paragraph:

[0028] The foregoing relates to preferred exemplary embodiments of the invention, it being understood that other variants and embodiments thereof are possible within the spirit and scope of the invention, the latter being defined by the appended claims.

**Page 7**, Line 1, delete "Claims" and insert --"We Claim"--.

**IN THE CLAIMS**

Please cancel claims 1-5 and add new claims 6-17.

6. A common rail system for supplying fuel to internal combustion engines, in particular

Diesel engines of passenger cars, the system comprising

a central high-pressure fuel reservoir (4),

high-pressure fuel lines (5, 7) providing communication between the reservoir and a plurality of injectors, and

a control device (13;17,19) operably connected to the respective injectors for controlling the opening and closing motions of the injectors,

said high-pressure fuel reservoir (4) and the control devices (13; 17, 19) being combined in a module(3), which communicates permanently with the injectors via high-pressure fuel lines (8, 48).

7. The common rail system of claim 6 further comprising at least one sensor (24) integrated with the module (3).

8. The common rail system of claim 6 wherein the control device comprises a first control valve member (13), which is received axially displaceably in the module (3) between an opened position, in which a communication between the high-pressure fuel reservoir (4) and the triggered injector is opened, and a closed position, in which the communication between the high- pressure fuel reservoir (4) and the respective injector is closed, as a function of the pressure in a control chamber (12), and a second axially displaceable control valve member (17, 19), received in the module (3), which opens a communication between the control chamber (12) and a pressureless return (18) as a function of the position of an axially displaceable actuator (22), in particular a piezoelectric actuator, and that the longitudinal axes of the first control valve member (13), the second control valve member (17, 19) and the actuator (22) are each disposed at a right angle to one another.

9. The common rail system of claim 7 wherein the control device comprises a first control valve member (13), which is received axially displaceably in the module (3) between an opened position, in which a communication between the high-pressure fuel reservoir (4) and the triggered injector is opened, and a closed position, in which the communication between the high-pressure fuel reservoir (4) and the respective injector is closed, as a function of the pressure in a control chamber (12), and a second axially displaceable control valve member (17, 19), received in the module (3), which opens a communication between the control chamber (12) and a pressureless return (18) as a function of the position of an axially displaceable actuator (22), in particular a piezoelectric actuator, and that the longitudinal axes of the first control valve member (13), the second control valve member (17, 19) and the actuator (22) are each disposed at a right angle to one another.

10. The common rail system of claim 6 wherein conventional nozzle holder combinations are used as injectors.

11. The common rail system of claim 7 wherein conventional nozzle holder combinations are used as injectors.

12. The common rail system of claim 8 wherein conventional nozzle holder combinations are used as injectors.

13. The common rail system of claim 9 wherein conventional nozzle holder combinations are used as injectors.

a cylinder head (1),  
a cylinder head cap (2), and  
a common rail supply system mounted between the cylinder head (1) and the cylinder head cap (2), the common rail fuel supply system including a central high-pressure fuel reservoir (4), high-pressure fuel lines (5, 7) providing communication between the reservoir and a plurality of injectors, and a control device (13;17,19) operably connected to the respective injectors for controlling the opening and closing motions of the injectors, said high-pressure fuel reservoir (4) and the control devices (13; 17, 19) being combined in a module(3), which communicates permanently with the injectors via high-pressure fuel lines (8, 48).

15. The internal combustion engine of claim 14 further comprising at least one sensor (24) integrated with the module.

16. The internal combustion engine of claim 14 wherein the control device comprises a first control valve member (13), which is received axially displaceably in the module (3) between an opened position, in which a communication between the high-pressure fuel reservoir (4) and the triggered injector is opened, and a closed position, in which the communication between the high- pressure fuel reservoir (4) and the respective injector is closed, as a function of the pressure in a control chamber (12), and a second axially displaceable control valve member (17, 19), received in the module (3), which opens a communication between the control chamber (12) and a pressureless return (18) as a function of the position of an axially displaceable actuator (22), in particular a piezoelectric actuator, and that the longitudinal axes of the first control valve member (13), the second control valve member (17, 19) and the actuator (22) are each disposed at a right angle to one another.

17. The internal combustion engine of claim 14 wherein conventional nozzle holder combinations are used as injectors.

IN THE ABSTRACT

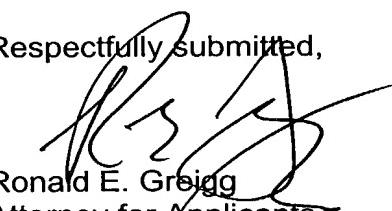
Substitute the attached rewritten Abstract of the Disclosure for the abstract as originally filed.

REMARKS

The above amendments are being made to place the application in better condition for examination.

Entry of the amendment is respectfully solicited.

Respectfully submitted,

  
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## **ABSTRACT OF THE DISCLOSURE**

The invention relates to a common rail system for supplying fuel to internal combustion engines, in particular Diesel engines of passenger cars, having a central high-pressure fuel reservoir, which via high-pressure fuel lines communicates with a plurality of injectors, whose opening and closing motions are controlled each by a respective control device. The high-pressure fuel reservoir and the control devices are combined in a module, which communicates permanently with the injectors via high-pressure fuel lines to furnish a common rail system suitable for vehicle engines.

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE SPECIFICATION**

**Page 1**, Between the title and paragraph [0001]:

[0000.2] **CROSS-REFERENCE TO RELATED APPLICATIONS**

[0000.4] **This application is a 35 USC 371 application of PCT/DE 01/02179 filed on June 12, 2001.**

[0000.6] **BACKGROUND OF THE INVENTION**

Paragraph [0001] has been amended as follows:

[0001] **Prior Art Field Of The Invention**

Between paragraphs [0002] and [0003]:

[0002.5] **Description of the Prior Art**

**Page 2**, Between paragraphs [0004] and [0005]:

[0004.5] **SUMMARY OF THE INVENTION**

Deleted paragraph [0007]:

[0007] **Advantages of the Invention**

**Page 4**, Between paragraphs [0012] and [0013]:

[0012.5] **BRIEF DESCRIPTION OF THE DRAWINGS**

Paragraph [0013] has been amended as follows:

[0013] Further advantages, characteristics and details of the invention will become

apparent from the ensuing description, taken with the drawings, in which; in which an exemplary embodiment of the invention is described in detail in conjunction with the drawing. The characteristics recited in the claims and in the description can each be essential to the invention individually or in arbitrary combination with one another.

Deleted paragraph [0014]:

[0014] Drawing

Deleted paragraph [0015]:

[0015] Shown in the drawing are:

Paragraph [0016] has been amended as follows:

[0016] Fig. 1, the is an elevation view of a longitudinal section through a common rail system of the invention; and

Paragraph [0018] has been amended as follows:

[0018] Description of the Exemplary Embodiment DESCRIPTION OF THE PREFERRED EMBODIMENTS

**Page 6, After paragraph [0027]:**

[0028] The foregoing relates to preferred exemplary embodiments of the invention, it being understood that other variants and embodiments thereof are possible within the spirit and scope of the invention, the latter being defined by the appended claims.

Page 9, Abstract

**Abstract ABSTRACT OF THE DISCLOSURE**

The invention relates to a common rail system for supplying fuel to internal combustion engines, in particular Diesel engines of passenger cars, having a central high-pressure fuel reservoir (4), which via high-pressure fuel lines (5, 7) communicates with a plurality of injectors, whose opening and closing motions are controlled each by 5 a respective control device (13; 17, 19).

— In order to furnish a common rail system that is suitable for vehicle engines, the The high-pressure fuel reservoir (4) and the control devices (13; 17, 19) are combined in a module, which communicates permanently with the injectors via high-pressure fuel lines 10 (8, 48) to furnish a common rail system suitable for vehicle engines.

(Fig. 1)